Appendix A

Waste Profile

WASTE PROFILE

WASTE PROFILE

PART I

A. GENERAL INFORMATION

WASTE PROFILE NO. _____

1. GENERATOR NAME

2. FACILITY ADDRESS/LOCATION

3. 20 X [illegible] TCLP ☐

Process Knowledge

4. WAG [illegible] Uniform Waste Stream

5. TECHNICAL CONTACT

6. TITLE

7. PHONE ( )

8. e-mail

B. 1. NAME OF WASTE

2. USEPA/or/STATE WASTE CODE(S) _____

3. PROCESS GENERATING WASTE _____

4. PROJECTED ANNUAL VOLUME/UNITS _____ 5. MODE OF COLLECTION _____

6. IS THIS WASTE A DOMESTIC LISTED WASTE AS DEFINED IN 40 CFR 261.31 ? _____

___ YES ___ NO

7. IS THIS WASTE RESTRICTED FROM LAND DISPOSAL (40 CFR 268)? ___ YES ___ NO

HAS AN EXEMPTION BEEN GRANTED? ___ YES ___ NO

IF YES, DOES WASTE MEET APPLICABLE TREATMENT STANDARDS? ___ YES ___ NO

PART II

1. MATERIAL CHARACTERIZATION

COLOR(required) _____

DENSITY _____ BTU/LB _____

TOTAL SOLIDS _____ ASH CONTENT _____

LAYERING (required) ___ MULTILAYERED ___ BILAYERED

___ SINGLE PHASE

2. RCRA CHARACTERISTICS

PHYSICAL STATE: ___ SOLID ___ LIQUID ___ SEMI-SOLID

___ GAS ___ OTHER

TREATMENT GROUP: ___ WASTEWATER ___ NON-WASTEWATER

___ IGNITABLE (D001) ___ REACTIVE (D003)

FLASH POINT (F) _____ ___ WATER REACTIVE

___ HIGH TOC (> 10%) ___ CYANIDE REACTIVE

4. MATERIAL COMPOSITION

COMPONENT	CONCENTRATION	RANGE

__ LOW TOC (< 10%)
__ CORROSIVE (D002)
pH _____
__ CORRODES STEEL

__ SULFIDE REACTIVE
__ TOXICITY CHARACTERISTIC
(SEE PART III)

TOTAL _____ 100%

3. CHEMICAL COMPOSITION (ppm or mg/L)

COPPER _____ PHENOLICS _____
NICKEL _____ TOTAL HALOGENS _____
ZINC _____ VOLATILE ORGANICS _____
CHROMIUM-HEX _____ PCBs _____
(OTHER) _____

NOTE: EXPLOSIVES, SHOCK-SENSITIVE, PYROPHORIC, AND ETIOLOGICAL WASTE NORMALLY MAY NOT BE ACCEPTED BY THE SSA DESIGNEE WITHOUT SPECIAL APPROVAL.

5. SHIPPING INFORMATION

DOT HAZARDOUS MATERIAL? __ YES __ NO
PROPER SHIPPING NAME _____
U.N. OR
HAZARD CLASS _____ N.A. NO. ___
ADDITIONAL DESCRIPTION _____
METHOD OF SHIPMENT __ BULK __ DRUM
CERCLA REPORTABLE QUANTITY (RQ) _____
EMERGENCY RESPONSE (800) # _____
DOT PUBLICATION 5800.4 PAGE NO. ___
SPECIAL HANDLING INFORMATION _____

6. GENERATOR INFORMATION

BASIS FOR INFORMATION:
__ GENERATOR KNOWLEDGE
__ CHEMICAL ANALYSIS *(ATTACH RESULTS)*
__ GENERATOR KNOWLEDGE WITH SUPPORTING DOCUMENTS *(Explain how and why these documents comply with RCRA requirements.)*

I, _____ HEREBY CERTIFY THAT ALL INFORMATION SUBMITTED IN AND ALL ATTACHED
(Print or Type Name)
DOCUMENTS IS TO THE BEST OF MY KNOWLEDGE AN ACCURATE REPRESENTATION OF THE WASTE TURNED IN TO THE SSA.
ALL KNOWN OR SUSPECTED HAZARDS HAVE BEEN DISCLOSED.

SIGNATURE OF GENERATOR'S REPRESENTATIVE	**DATE**

7. WASTE ACCEPTANCE INTO: ☐ ICDF landfill ☐ SSTF ☐ Evaporation Pond

SIGNATURE OF ICDF Complex DESIGNEE **Preliminary Acceptance**	**DATE**
SIGNATURE OF ICDF Complex DESIGNEE **Final Acceptance**	**DATE**

PART III

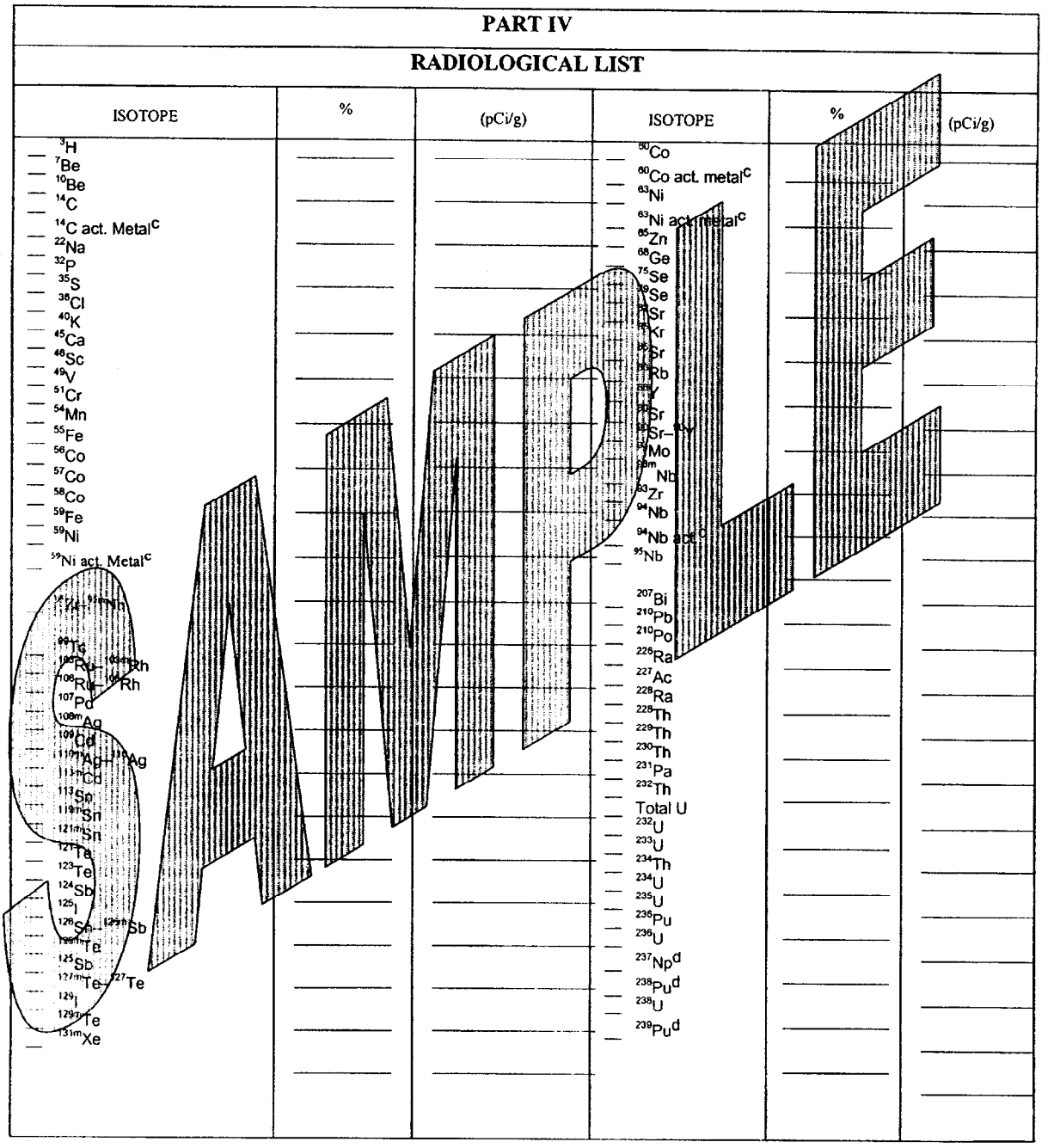
HAZARDOUS CHARACTERISTIC LIST

☐ Total Metals ☐ TCLP* ☐ Process Knowledge

CONTAMINANT	EPA HW No.	(mg/L)	CONTAMINANT	EPA HW No.	(mg/L)
__ ARSENIC	D004		__ HEXACHLORO-1,3,-BUTADIENE	D033	
__ BARIUM	D005		__ HEXACHLOROETHANE	D034	
__ BENZENE	D018		__ LEAD	D008	
__ CADMIUM	D006		__ LINDANE	D013	
__ CARBON TETRACHLORIDE	D019		__ MERCURY	D009	
__ CHLORDANE	D020		__ METHOXYCHLOR	D014	
__ CHLOROBENZENE	D021		__ METHYL ETHYL KETONE	D035	
__ CHLOROFORM	D022		__ NITROBENZENE	D036	
__ CHROMIUM	D007		__ PENTACHLOROPHENOL	D037	
__ O-CRESOL	D023		__ PYRIDINE	D038	
__ M-CRESOL	D024		__ SELENIUM	D010	
__ P-CRESOL	D025		__ SILVER	D011	
__ CRESOL	D026		__ TETRACHLOROETHYLENE	D039	
__ 2,4-D	D016		__ TOXOPHENE	D015	
__ 1,4-DICHLOROBENZENE	D027		__ TRICHLOROETHYLENE	D040	
__ 1,2-DICHLOROETHANE	D028		__ 2,4,5-TRICHLOROPHENOL	D041	
__ 1,1-DICHLOROETHYLENE	D029		__ 2,4,6-TRICHLOROPHENOL	D042	
__ 2,4-DINITROTOLUENE	D030		__ 2,45-TP (SILVEX)	D017	
__ ENDRIN	D012		__ VINYL CHLORIDE	D043	
__ HEPTACHLOR AND ITS HYDROXIDE	D031				
__ HEXACHLOROBENZENE	D032				

***TCLP data are required for waste streams where total metals exceed 20X the TCLP LDRs.**

All required analysis for this sheet must be attached prior to submittal.


PART IV
RADIOLOGICAL LIST
ISOTOPE
%
(pCi/g)
ISOTOPE
%
(pCi/g)
^{3}H
^{7}Be
^{10}Be
^{14}C
^{14}C act. Metal[C]
^{22}Na
^{32}P
^{35}S
^{36}Cl
^{40}K
^{45}Ca
^{46}Sc
^{49}V
^{51}Cr
^{54}Mn
^{55}Fe
^{56}Co
^{57}Co
^{58}Co
^{59}Fe
^{59}Ni
^{59}Ni act. Metal[C]
^{60}Co
^{60}Co act. metal[C]
^{63}Ni
^{63}Ni act. metal[C]
^{65}Zn
^{68}Ge
^{75}Se
^{90}Sr
^{90}Sr–^{90}Y
^{93}Mo
^{93m}Nb
^{93}Zr
^{94}Nb
^{94}Nb act.[C]
^{95}Nb
^{99}Tc
^{103}Ru
^{103m}Rh
^{106}Ru
^{106m}Rh
^{107}Pd
^{108m}Ag
^{109}Cd
^{110m}Ag
^{110}Ag
^{113}Cd
^{113}Sn
^{119m}Sn
^{121m}Sn
^{121}Te
^{123}Te
^{124}Sb
^{125}I
^{126}Sn
^{125m}Sb
^{125}Te
^{125}Sb
^{127m}Te
^{127}Te
^{129}I
^{129m}Te
^{131m}Xe
^{207}Bi
^{210}Pb
^{210}Po
^{226}Ra
^{227}Ac
^{228}Ra
^{228}Th
^{229}Th
^{230}Th
^{231}Pa
^{232}Th
Total U
^{232}U
^{233}U
^{234}Th
^{234}U
^{235}U
^{236}Pu
^{236}U
^{237}Np[d]
^{238}Pu[d]
^{238}U
^{239}Pu[d]

RADIOLOGICAL LIST (continued)

ISOTOPE	%	(pCi/g)	ISOTOPE	%	(pCi/g)
^{133}Ba			^{240}Pu^{d}		
^{134}Cs			^{241}Am^{d}		
^{135}Cs			^{241}Pu		
^{137}Cs–^{137m}Ba			^{242m}Am^{i}		
^{140}Ba			^{242}Cm		
^{141}Ce			^{242}Pu^{d}		
^{144}Ce–^{144}Pr			^{243}Am^{d}		
^{147}Nd			^{243}Cm^{d}		
^{147}Pm			^{244}Cm		
^{147}Sm			^{244}Pu^{d}		
^{150}Eu			^{245}Cm^{d}		
^{151}Sm			^{246}Cm^{d}		
^{152}Eu			^{247}Bk^{d}		
^{152}Gd			^{247}Cm^{d}		
^{153}Gd			^{248}Cm^{d}		
^{154}Eu			^{249}Cf^{d}		
^{155}Eu			^{250}Cf		
^{170}Tm			^{250}Cm^{d}		
^{175}Hf			^{251}Cf^{d}		
^{181}Hf			^{252}Cf		
^{182}Ta			^{254}Es		
^{185}W					
^{187}Re					
^{195}Au					
^{203}Hg					
^{204}Tl					

SAMPLE

PART V

LABELING	Yes	no
1. Are containers marked with the waste generation date?		
2. Does container have CERCLA label?		
3. Does container have WTS label?		
4. PCB Containing Waste (40 CFR 761.45)?		
Large PCB Mark (M_L) [for large containers] | Small PCB Mark (M_S) [used for small containers]		

PART VI

PACKAGING TYPE

Waste Type	55 Gallon Drums[a] Or other sized steel drums	Roll Off Containers[a]	Crosslink Polyethylene Tanks (storage) Or tanker truck (transport) VOT[c]	VOT[c]	INEEL Wood Boxes[a] 2 x 4 x 8 ft 4 x 4 x 4 ft 4 x 4 x 8 ft
Hazardous	XX	XX	—	—	XX
RAD[b]	XX	XX	—	—	XX
RAD & Mixed RAD[b]	XX	XX	—	—	XX
Asbestos-TSCA	XX	XX	—	—	XX
Asbestos-TSCA/RAD Waste[b]	XX	XX	—	—	XX
Purge Water	—	—	XX	XX	—
Case-by-Case[d]	XX	XX	XX	XX	XX

a. Drums, roll-offs, and INEEL wood boxes will be lined with polyethylene liners (or supersacks).

b. Low-level radioactive waste shall be packaged for disposal in accordance with 10 CFR 61.56(a). The container must also be surveyed to ensure occupational exposures to radiation are < 500 mR/h at 1 meter for the exterior of the container. If the container's radiation level is > 500 mR/h then the container must be shielded by other containers within the SSA.

c. VOT (Vertical Closed Top) and VOT (Vertical Open Top) above ground tanks will meet or exceed ASTM D 1998-91, Type I: Tanks molded from crosslinkable polyethylene.

d. Wastes accepted on a case-by-case basis could require special container requirements. Therefore, the generator must verify proper containers with 49 CFR 101, Subpart C

NOTE: Other types of containers may be used if they have received approval prior to shipment.

Appendix B

Fissionable Material Content Limits

APPENDIX B

FISSIONABLE MATERIAL CONTENT LIMITS

The following describes the limits for fissionable material content in waste packages sent to the ICDF covered by criteria provided in Chapters 3.0 through 6.0.

B-1. EXEMPT MATERIALS

The following materials are exempt from criticality safety controls at all TSD units (HNF-PRO-537):

- 15 grams or less of any combination of ^{233}U, ^{235}U, ^{237}Np, ^{238}Pu, ^{239}Pu, ^{240}Pu, ^{241}Pu, ^{242}Pu, and ^{241}Am
- 2 grams or less of any fissionable nuclide with atomic number greater than or equal to 95 (excluding ^{241}Am)
- Depleted or natural uranium in any amount (i.e., uranium containing less than 0.72 weight percent ^{235}U).

B-2. NONEXEMPT MATERIALS IN STANDARD CONTAINERS APPLICABLE TO ICDF COMPLEX

Certain nonexempt materials in standard packaging configurations are acceptable at the ICDF landfill.

The fissionable material limits shall be expressed in ^{239}Pu FGEs. Table B-1 is used to determine the total quantity of fissionable material in a waste container by multiplying the gram quantity of each listed isotope by the correction factor and summing the results.

Specific container limits are shown in Table B-2. Note that some of the limits in Table B-2 are based on criticality prevention requirements. Higher quantities of fissionable nuclides could be allowed on a case-by-case basis.

B-3. NONEXEMPT QUANTITIES OF URANIUM-BEARING WASTE APPLICABLE TO CWC, LLBG, AND WRAP

This section only applies to uranium-bearing waste where the uranium is enriched to 0.72% ^{235}U or greater and the total quantity of fissionable material per container exceeds that listed in Table B-2. Use of these limits for uranium-bearing waste exceeding 1% enrichment requires that the uranium be in an insoluble or stabilized form.

For uranium-bearing waste that contains uranium in a single enrichment, the limits of Table B-3 shall apply to each container in a shipment. For criticality control, other transportation limits might apply to the entire shipment.

For uranium-bearing waste containers that have uranium in a variety of different enrichments or contain any other isotopes listed in Table B-1, the fissionable material allowed shall be determined by the sum-of-fractions method as follows:

- The total U quantity present (grams) for each enrichment will be divided by the total quantity allowed (second column in Table B-3). Enrichments shall be conservatively rounded up to the next higher value listed. The result is the uranium limit fraction (ULF).

- A uranium limit fraction shall be determined for each enrichment.

- All the uranium limit fractions are summed, the total must be less than or equal to 1.

The limit for all fissionable isotopes, other than ^{235}U in the waste matrix, shall be determined if the total FGE (excluding ^{235}U) greater than 1 for these isotopes (it is neglected if the total FGE is less than or equal to 1). This nonuranium limit fraction (NLF) shall be determined as follows:

$$NLF = \frac{FGE(without\ ^{235}U)}{100\ FGE}$$

The nonuranium limit fraction must be less than or equal to 1.

The container limit fraction is determined by adding the total uranium limit fraction and the nonuranium limit fraction. The container limit fraction must be less than or equal to 1.

B-4. NONEXEMPT QUANTITIES OF FISSIONABLE RADIONUCLIDES IN OTHER CONFIGURATIONS

Limits for other configurations than those shown in Sections 2 and 3 may be requested as described in the text, Section 5.4.3.

Table B- 1. Plutonium-239 fissile gram equivalent correction factors.

Isotope	Correction Factor	Isotope	Correction Factor
$^{233}U^{a}$	1.0 E+00	^{242}Am	3.46 E+01
$^{235}U^{b}$	1.0 E+00	^{243}Am	1.29 E-02
$^{237}Np^{c}$	1.5 E-02	^{243}Cm	5.0 E+00
$^{238}Pu^{c}$	1.13 E-01	^{244}Cm	9.00 E-02
$^{239}Pu^{c}$	1.0 E+00	^{245}Cm	1.50 E+01
$^{240}Pu^{c}$	2.25 E-02	^{247}Cm	5.00 E-01
$^{241}Pu^{c}$	2.25 E+00	^{249}Cf	4.50 E+01
$^{242}Pu^{c}$	7.50 E-03	^{251}Cf	9.00 E+01
^{241}Am	1.87 E-02		

a. ^{233}U is normally negligible unless the materials have been enriched in ^{233}U.

b. ^{235}U is not included in calculating FGE unless it is enriched (greater than or equal to 0.72 wt% ^{235}U in uranium).

c. For conservatism, all plutonium is normally considered to be ^{239}Pu unless the isotopic composition is known.

Sources: DOE/WIPP 89-004 (1996) and ANSI/ANS 8.15.

Table B-2. Fissionable material content limits for certain standard containers.

Container Type	Fissionable Material Content[a]
208-L (55-gal) or larger steel drum, where fissile material is contained in 20% or more of the container volume	177 FGE[b]
208-L (55-gal) or larger steel drum, where fissile material is contained in less than 20% of the container volume	100 FGE[b]
208-L (55-gal) lead-lined steel drum	100 FGE[b]
DOT or NRC -approved containers (e.g., DOT Specification 6M)	Maximum fissile content may not exceed that which is acceptable for transportation as specified in the DOT regulations or the NRC Certificate of Compliance
Steel box containing flushed and drained equipment and/or HEPA filters: all of the following limits shall apply:	• 325 FGE per piece of equipment • 353 FGE/m^3 (10 EGE/ft^3) on HEPA filters • 15 FGE in waste other than equipment or HEPA filters • 250 FGE total in box larger than 0.76 × 0.76 × 0.76 m (2.5 × 2.5 × 2.5 ft) • 325 FGE total in box larger than 0.9 × 1.4 × 1.5 m (3 × 4 × 5 ft) • 1,000 FGE total in box larger than 1.2 × 1.2 × 2.1 m (4 × 4 × 7 ft)

a. Some of these limits are based on WRAP criticality prevention requirements, which are more restrictive than CWC and LLBG limits. Higher quantities of fissionable nuclides could be allowed on a case-by-case basis for containers that will not require reprocessing at WRAP.

b. This limit assumes that the steel drum weighs a minimum of 23 kg (50.7 lb) excluding the liner. Any drum that weighs less than 23 kg (50.7 lb) requires overpacking or completion of a criticality safety evaluation.

Source: CPS-D-149-00001, CPS-SW-149-00002, CPS-SW-149-00003, WRPI-CPS-001.

Table B-3. Maximum uranium content of containers with uranium-bearing waste.

Maximum Enrichment (weight percent ^{235}U)[a]	Maximum Total Uranium (kilogram)
0.71	Unlimited
1.00	450
1.15	200
1.25	141
1.50	84
1.70	61
1.80	52
2.00	40
2.50	25
3.00	18
3.50	14
1.0	11
5.0	7.8
8.0	4.0
10.0	2.9
20.0	1.2
30.0	0.75
50.0	0.41
75.0	0.25
Greater than 75.0	0.18

a. Uranium-bearing waste disposed at trenches 31 and 34 in the LLBG cannot exceed 1% enrichment unless it is shown to be in an insoluble or stabilized form. A case-by-case evaluation will be performed by WMH acceptance organization for non-exempt uranium bearing waste exceeding 1% enrichment for trenches 31 and 34.

Sources: CPS-D-149-00001, CPS-SW-149-00002, CPS-SW-149-00003, WRPI-CPS-001.

B-5. REFERENCES

ANS 8.15, "Nuclear Criticality Control of Special Actinide Elements," American Nuclear Society, 1981.